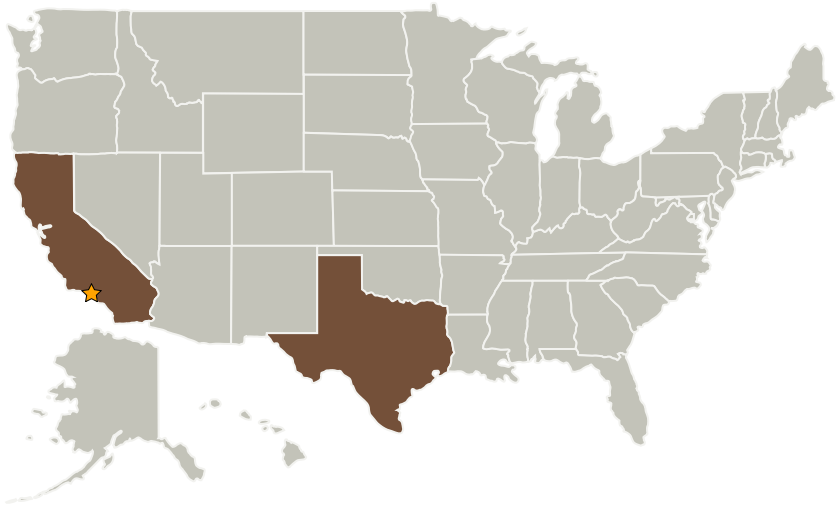
# Highly Efficient and Robust Micropump for Small Spacecraft Thermal Control, Phase I

Completed Technology Project (2009 - 2009)

## Project Introduction

With the introduction of low-cost, small, rapidly configurable spacecraft, the need for robust, versatile, readily deployable, and easily ground-testable thermal control technologies becomes ever more critical. Passive two-phase thermal control technology, that is, heat pipes, defines the current state-of-the-art, yet it is clear that this technology alone will not meet the needs of future spacecraft. Dramatic improvements in the versatility and effectiveness of heat pipes are possible with a small amount of mechanical pumping assistance. With the separation of the liquid pumping and heat transfer functions, greater design freedom and system optimization is also afforded. However, before pump-assisted heat pipes can become a viable alternative, significant improvement in pump lifetime and robustness is needed. Lynntech proposes to develop a long-life, robust, low-power, high pressure-rise, electrochemically-driven micropump for use in pump-assisted heat pipes.

## Primary U.S. Work Locations and Key Partners



| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| ★Jet Propulsion Laboratory(JPL) | Lead Organization | NASA Center | Pasadena, California |
| Lynntech, Inc. | Supporting Organization | Industry | College Station, Texas |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## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Center / Facility:**

Jet Propulsion Laboratory (JPL)

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

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|---|---|
| California | Texas |

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

Carlos Torrez

## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.2 Heat Transport